

Osprey



Figure 1: Osprey brood in Perthshire (Photo: Keith Brockie, Tayside & Fife RSG).

Osprey is monitored widely across Scotland by SRMS data contributors.

Our latest analysis of SRMS Osprey data for the period 2009-2018 produced national trends for breeding success, clutch size, brood size and number of fledglings (Table 1). Trends in breeding numbers and productivity were produced for six of the eight SRMS regions (Table 2) and for six of the 18 NHZ regions for which the SRMS holds records for Osprey (Table 3).

Users of the published trends should be aware that while records for both trends in breeding numbers and productivity are drawn from much of the Osprey's range, none of these come from south of the Central Belt (Figure 13). There are also some gaps in coverage in the Highlands, including the heartland of the Osprey's Scottish range in Speyside

(Figure 13). Ongoing population expansion can be difficult to monitor with study areas focused on existing concentrations of birds and in areas where survey effort is limited. Consultation with contributors has highlighted that it may be possible to miss new pairs establishing in between monitored sites ('in-filling'), even in well monitored study areas, if limited time is available to search for new territories (e.g. in Lothian & Borders, where the focus on monitoring at platforms leaves limited time to search for natural nest sites in the region).

National trends

A national trend in breeding numbers is not available. Breeding success showed non-linear variation (Table 1, Figure 2). Trends for clutch size, brood size and number of fledglings all showed no significant change (Table 1, Figure 2).

SRMS regional trends

There was a significant increase in breeding numbers of Osprey in Highland (+4.9%) but no significant change in four more regions (Argyll, Central, North East Scotland and Tayside & Fife) (Table 2, Figure 3).

Breeding success of Osprey decreased significantly in Lothian & Borders (-1.7%), with no significant change in five other regions (Argyll, Central, Highland, North East Scotland and Tayside & Fife) (Table 2, Figure 4).

Clutch size, brood size and number of fledglings showed no significant change in Tayside & Fife (Table 2, Figures 5-7). Number of fledglings did not change significantly in a further four regions (Argyll, Central, Highland and North East Scotland) (Table 2, Figure 7).

Trends for this species are not yet available for Dumfries & Galloway or South Strathclyde.

NHZ regional trends

There was a significant increase in breeding numbers of Osprey in NHZ 21 (+5.1%) but no significant change in two more regions (NHZs 14 and 16) (Table 3, Figure 8).

Breeding success of Osprey did not change significantly in six regions (NHZs 12, 14-16 and 20-21) (Table 3, Figure 9).

Clutch size, brood size and number of fledglings showed no significant change in NHZ 16 (Table 3, Figures 10-12). Number of fledglings did not change significantly in a further three regions (NHZs 14-15 and 21) (Figure 12).

Trends for this species are not yet available for NHZs 04-05, 07-11, 13 and 17-19.

Details of contributing records

2,743 (151 to 326 per year, mean: 274 records) from 2009-2018 contributed to this trends analysis (Table 6).

Table 1: Summary of SRMS national trends for Osprey during 2009-2018. Non-significant changes are highlighted in grey. 'Non-linear' indicates non-linear trends.

	Pairs	Success	Clutch size	Brood size	Number of fledglings
Scotland	—	Non-linear	Not significant	Not significant	Not significant

Table 2: Summary of SRMS regional trends for Osprey during 2009-2018. Figures in parentheses indicate the annual change, with significant increases highlighted in green, significant decreases highlighted in blue and non-significant changes highlighted in grey. ‘—’ indicates where the species occurs but no trend is available. ‘No SRMS data’ indicates where the SRMS does not hold any records for the region of interest. ‘Absent’ indicates where the species is not known to breed.

SRMS Region	Pairs	Success	Clutch size	Brood size	Number of fledglings
Argyll	Not significant ^s	Not significant ^s	—	—	Not significant
Central	Not significant	Not significant	—	—	Not significant
Dumfries & Galloway	—	—	—	—	—
Highland	Increase (4.9%)	Not significant	—	—	Not significant
Lewis & Harris	Absent	Absent	Absent	Absent	Absent
Lothian & Borders	—	Decrease ^s (-1.7%)	—	—	—
North East Scotland	Not significant ^s	Not significant	—	—	Not significant
Orkney	Absent	Absent	Absent	Absent	Absent
Shetland	Absent	Absent	Absent	Absent	Absent
South Strathclyde	—	—	—	—	—
Tayside & Fife	Not significant ^s	Not significant	Not significant	Not significant	Not significant
Uist	Absent	Absent	Absent	Absent	Absent

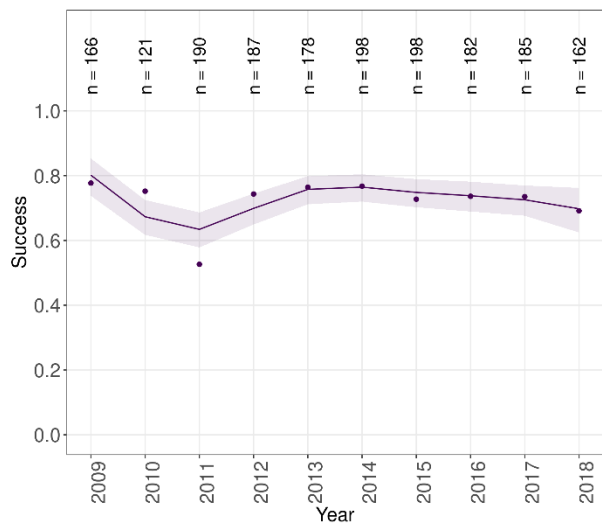
^s Sample sizes small.

Table 3: Summary of NHZ regional trends for Osprey during 2009-2018. Figures in parentheses indicate the annual change, with significant increases highlighted in green and non-significant changes highlighted in grey. ‘—’ indicates where the species occurs but no trend is available. ‘No SRMS data’ indicates where the SRMS does not hold any records for the region of interest. ‘Absent’ indicates where the species is not known to breed.

NHZ Region	Pairs	Success	Clutch size	Brood size	Number of fledglings
01. Shetland	Absent	Absent	Absent	Absent	Absent
02. North Caithness and Orkney	No SRMS data	No SRMS data	No SRMS data	No SRMS data	No SRMS data
03. Coll, Tiree and the Western Isles	Absent	Absent	Absent	Absent	Absent
04. North West Seaboard	—	—	—	—	—
05. The Peatlands of Caithness and Sutherland	—	—	—	—	—
06. Western Seaboard	Absent	Absent	Absent	Absent	Absent
07. Northern Highlands	—	—	—	—	—
08. Western Highlands	—	—	—	—	—
09. North East Coastal Plain	—	—	—	—	—
10. Central Highlands	—	—	—	—	—
11. Cairngorm Massif	—	—	—	—	—
12. North East Glens	—	Not significant ^s	—	—	—
13. East Lochaber	—	—	—	—	—
14. Argyll West and Islands	Not significant ^s	Not significant ^s	—	—	Not significant
15. Loch Lomond, The Trossachs and Breadalbane	—	Not significant ^s	—	—	Not significant
16. Eastern Lowlands	Not significant	Not significant	Not significant ^{rs}	Not significant ^{rs}	Not significant
17. West Central Belt	—	—	—	—	—
18. Wigtown Machairs and Outer Solway Coast	—	—	—	—	—
19. Western Southern Uplands and Inner Solway	—	—	—	—	—
20. Border Hills	—	Not significant ^s	—	—	—
21. Moray Firth	Increase (5.1%)	Not significant	—	—	Not significant

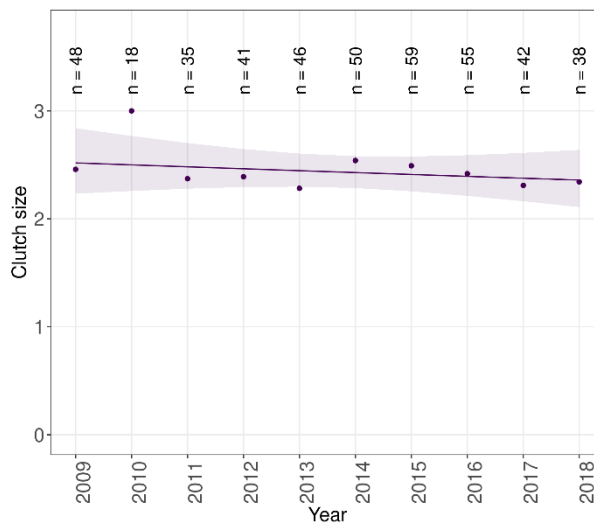
^r No home range random effect, ^s Sample sizes small.

Trend in Success of Osprey in Scotland using SRMS data



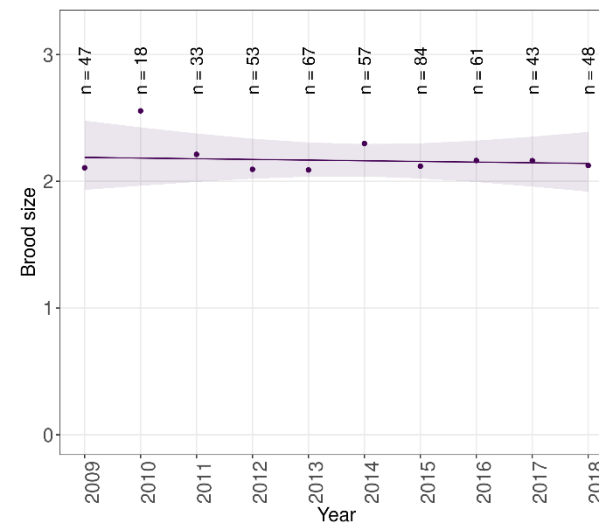
Scotland trend: Non-linear

Trend in Clutch size of Osprey in Scotland using SRMS data



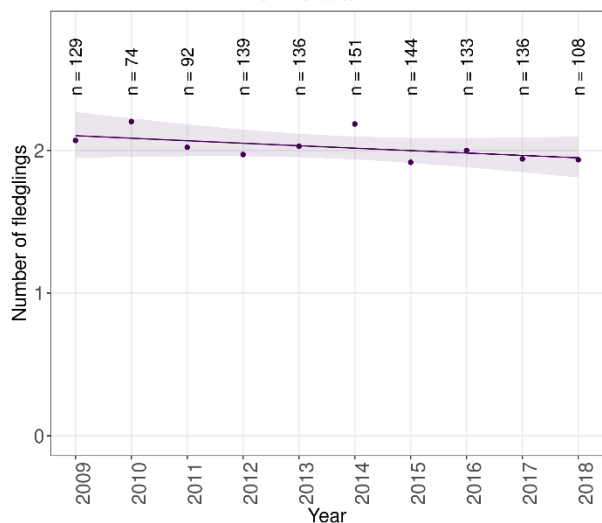
Scotland trend: Not significant

Trend in Brood size of Osprey in Scotland using SRMS data



Scotland trend: Not significant

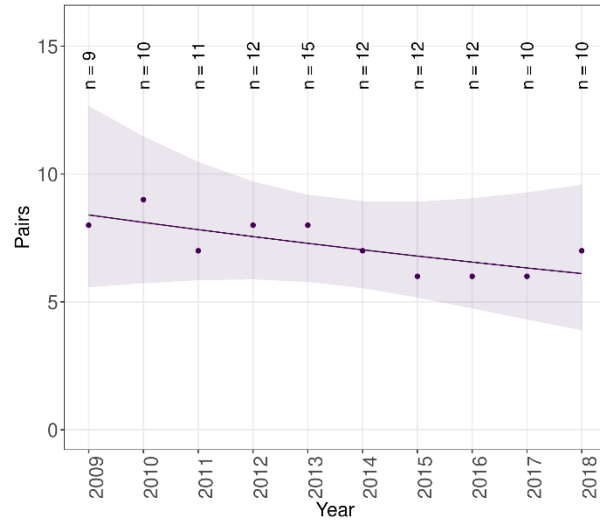
Trend in Number of fledglings of Osprey in Scotland using SRMS data



Scotland trend: Not significant

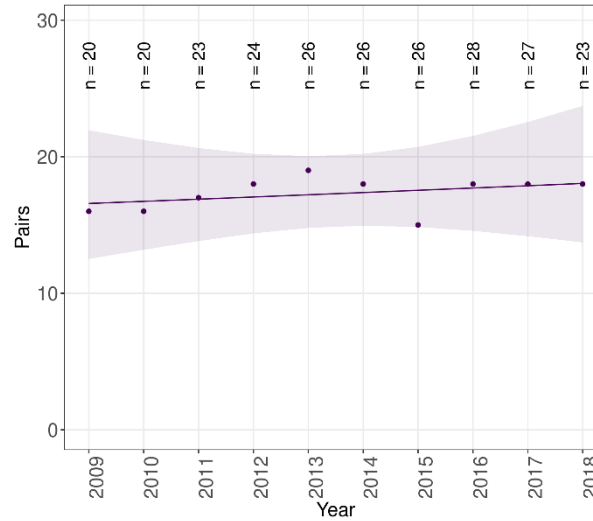
Figure 2: Trends in clutch size, brood size and number of fledglings of Osprey in Scotland during 2009-2018.

Trend in Pairs of Osprey in Argyll using SRMS data



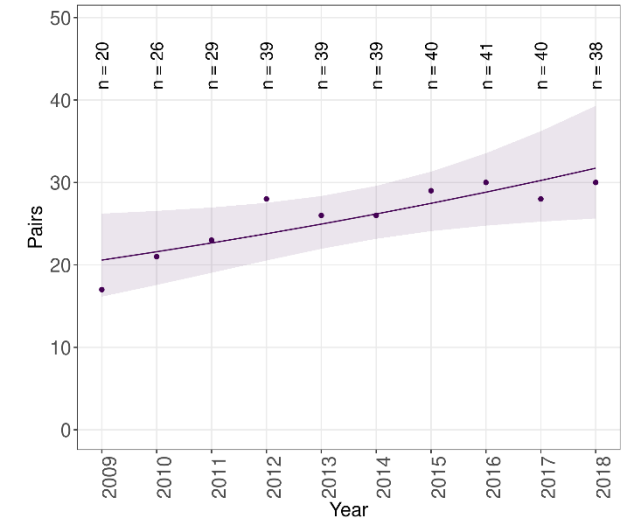
Argyll trend: Not significant (caveats: Sample sizes small)

Trend in Pairs of Osprey in Central using SRMS data



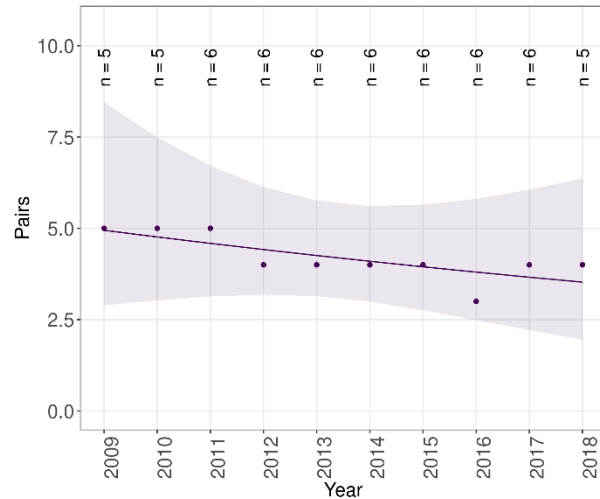
Central trend: Not significant

Trend in Pairs of Osprey in Highland using SRMS data



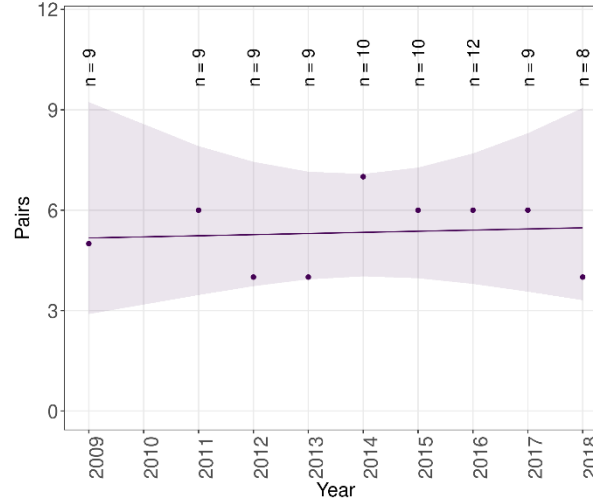
Highland trend: Increase

Trend in Pairs of Osprey in North East Scotland using SRMS data



North East Scotland trend: Not significant (caveats: Sample sizes small)

Trend in Pairs of Osprey in Tayside & Fife using SRMS data



Tayside & Fife trend: Not significant (caveats: Sample sizes small)

Figure 3: Trends in numbers of breeding pairs of Osprey by SRMS region during 2009-2018.

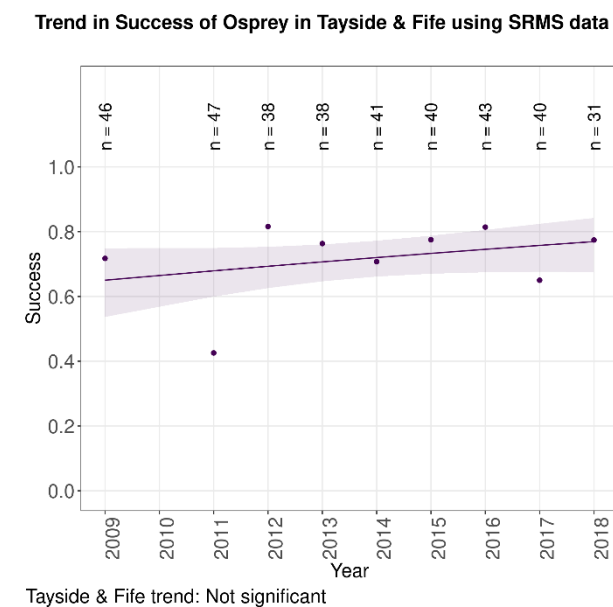
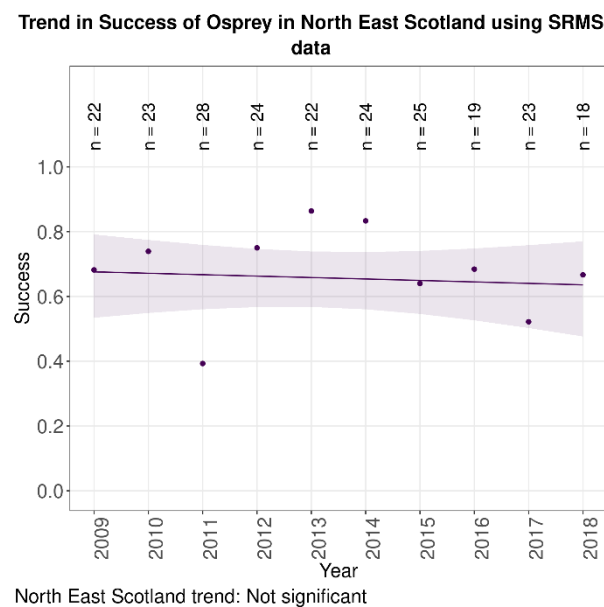
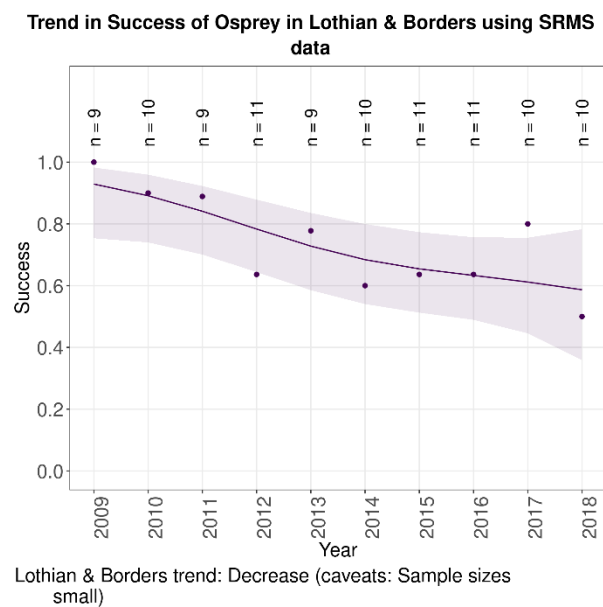
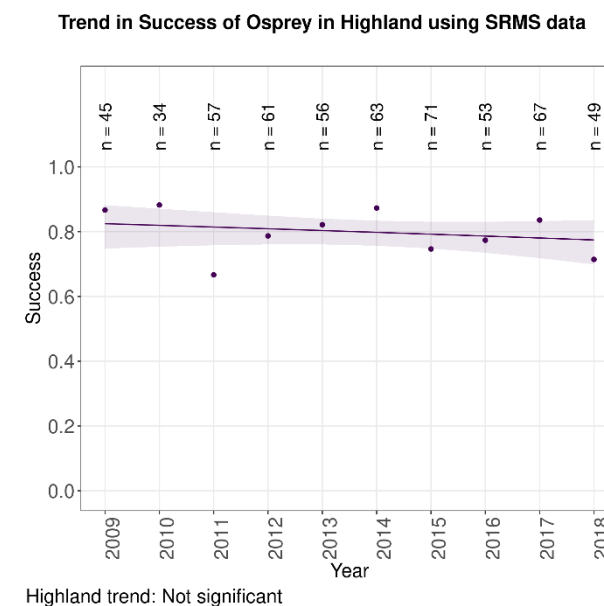
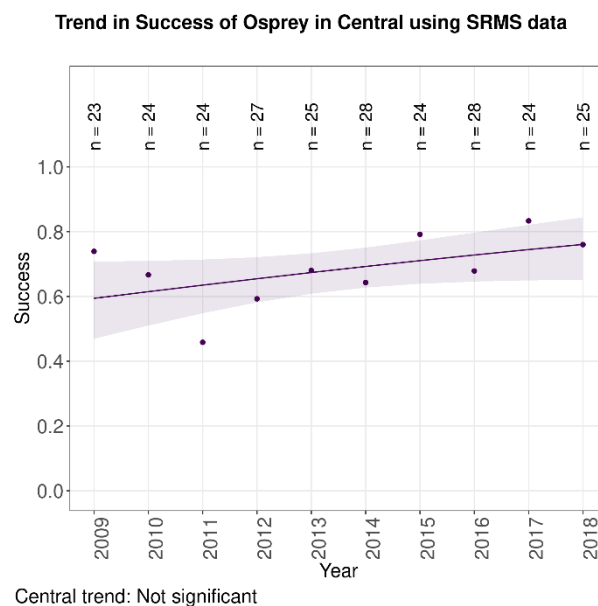
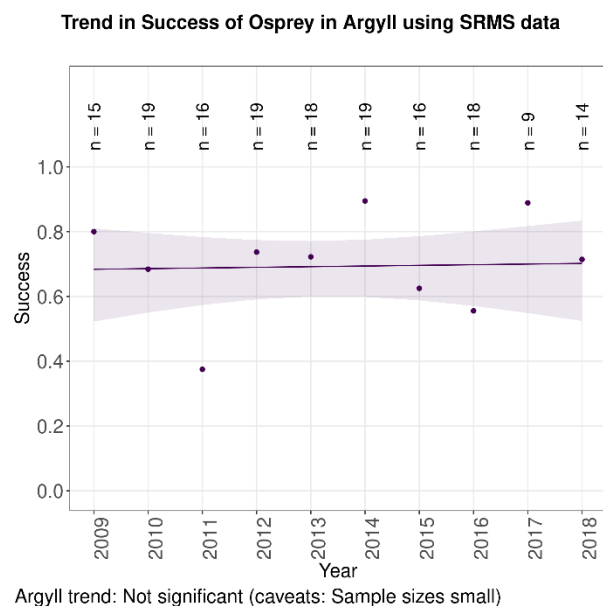


Figure 4: Trends in breeding success of Osprey by SRMS region during 2009-2018.

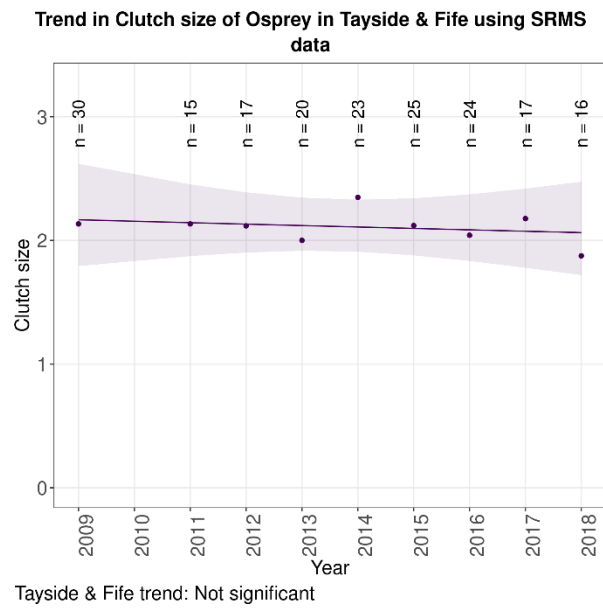


Figure 5: Trends in clutch size of Osprey by SRMS region during 2009-2018.

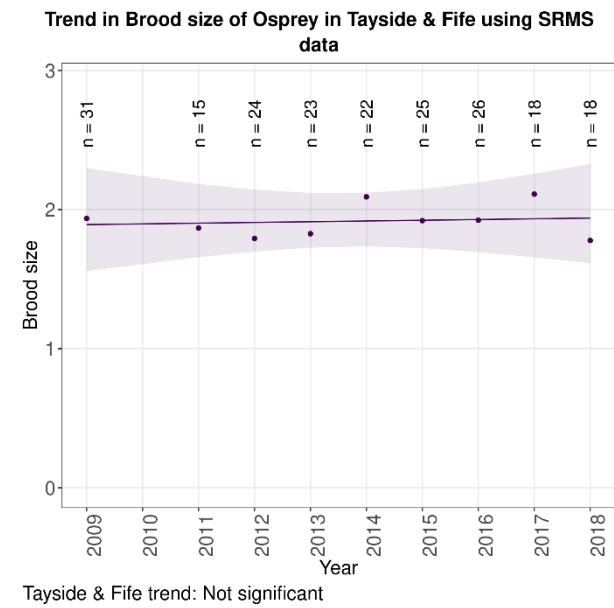
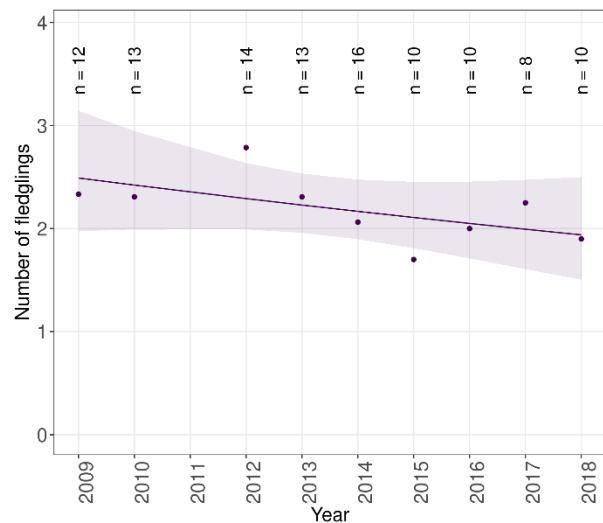


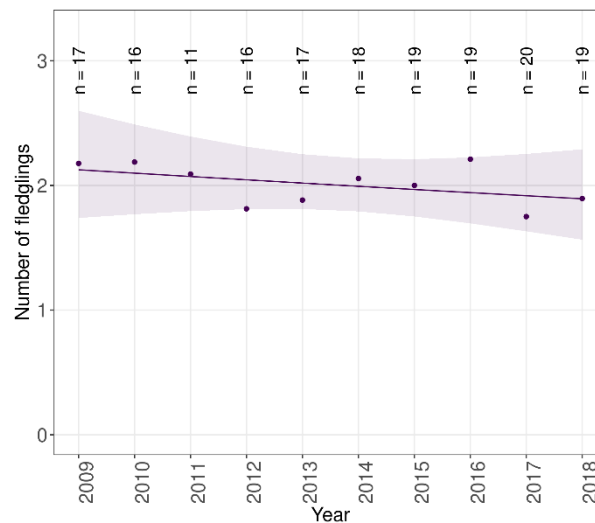
Figure 6: Trends in brood size of Osprey by SRMS region during 2009-2018.

Trend in Number of fledglings of Osprey in Argyll using SRMS data



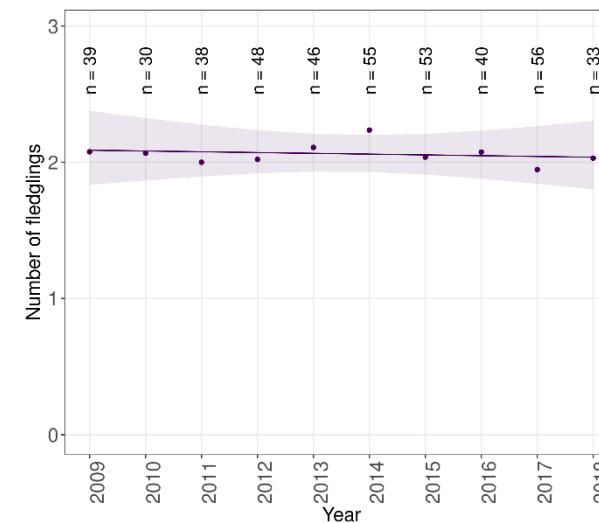
Argyll trend: Not significant

Trend in Number of fledglings of Osprey in Central using SRMS data



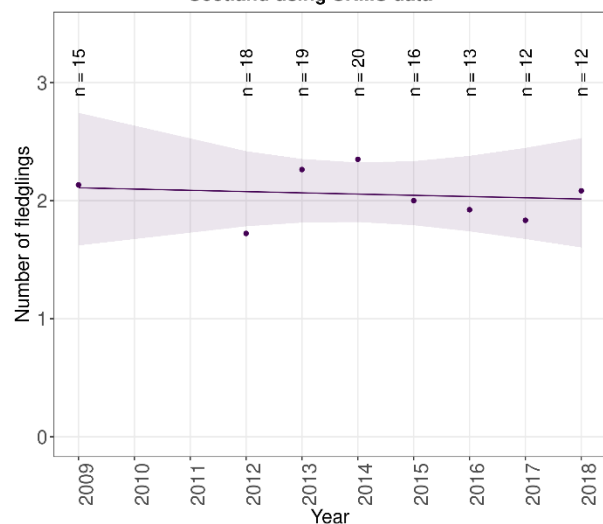
Central trend: Not significant

Trend in Number of fledglings of Osprey in Highland using SRMS data



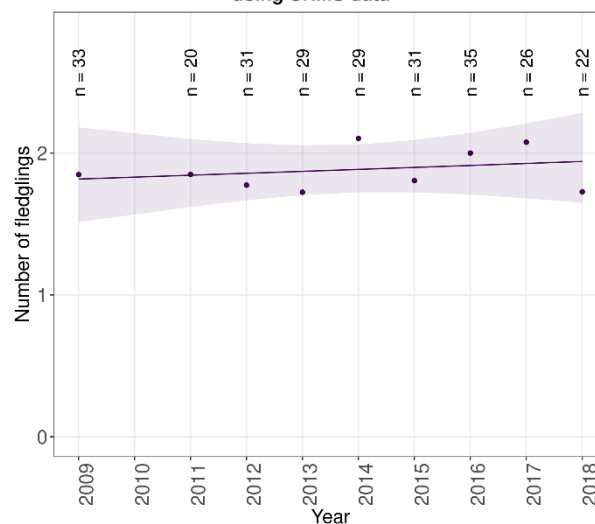
Highland trend: Not significant

Trend in Number of fledglings of Osprey in North East Scotland using SRMS data



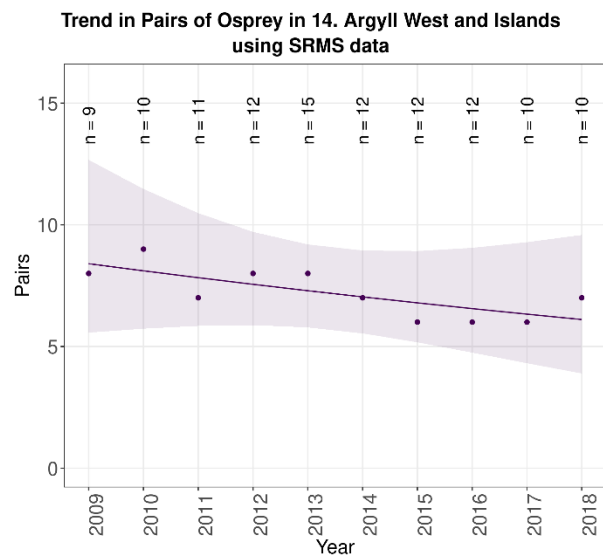
North East Scotland trend: Not significant

Trend in Number of fledglings of Osprey in Tayside & Fife using SRMS data

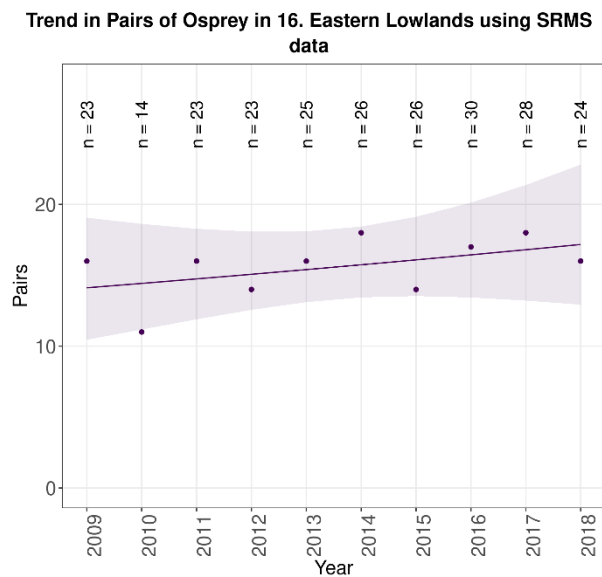


Tayside & Fife trend: Not significant

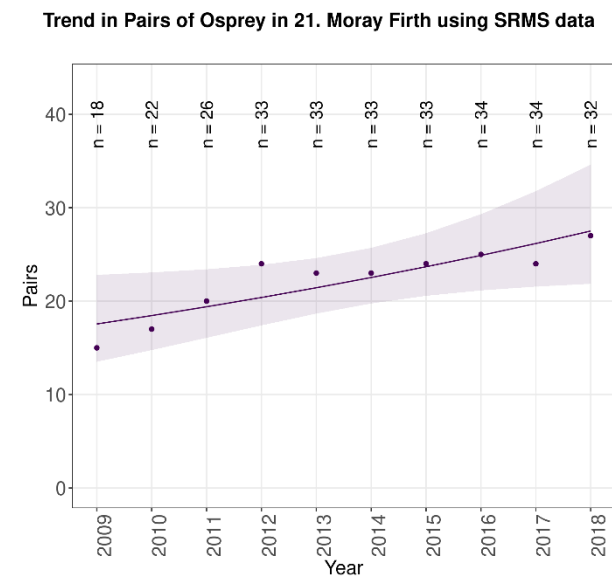
Figure 7: Trends in number of fledglings of Osprey by SRMS region during 2009-2018.



14. Argyll West and Islands trend: Not significant (caveats: Sample sizes small)

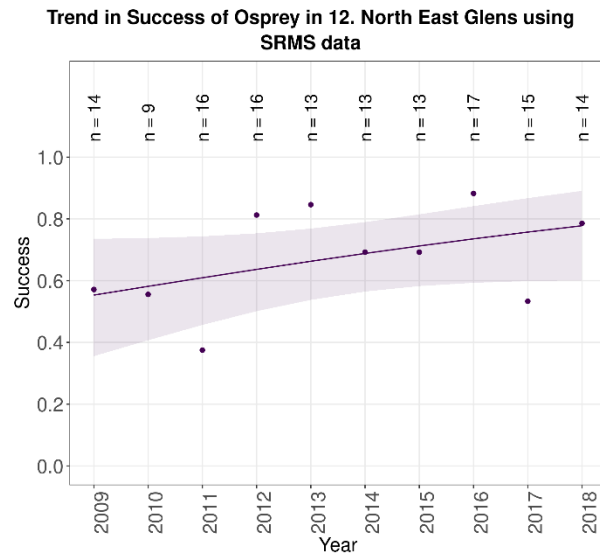


16. Eastern Lowlands trend: Not significant

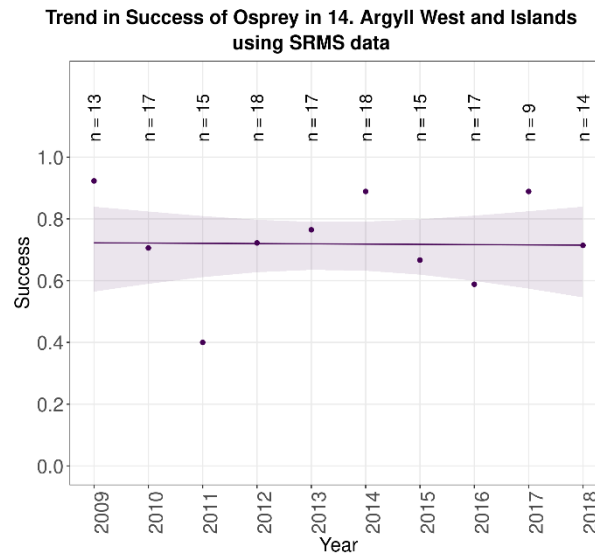


21. Moray Firth trend: Increase

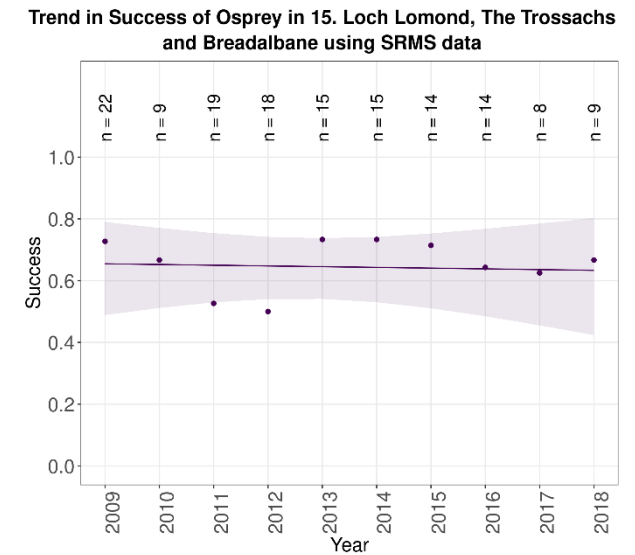
Figure 8: Trends in numbers of breeding pairs of Osprey by NHZ region during 2009-2018.



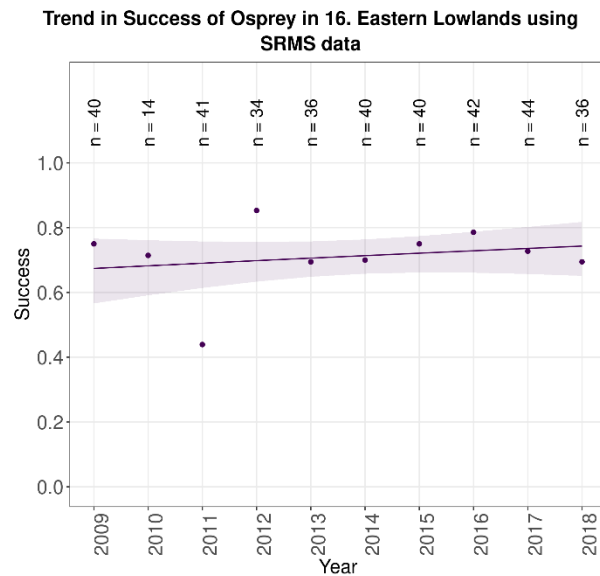
12. North East Glens trend: Not significant (caveats: Sample sizes small)



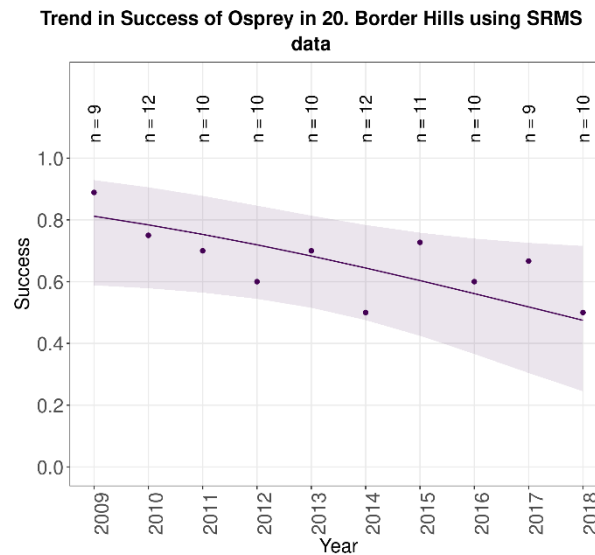
14. Argyll West and Islands trend: Not significant (caveats: Sample sizes small)



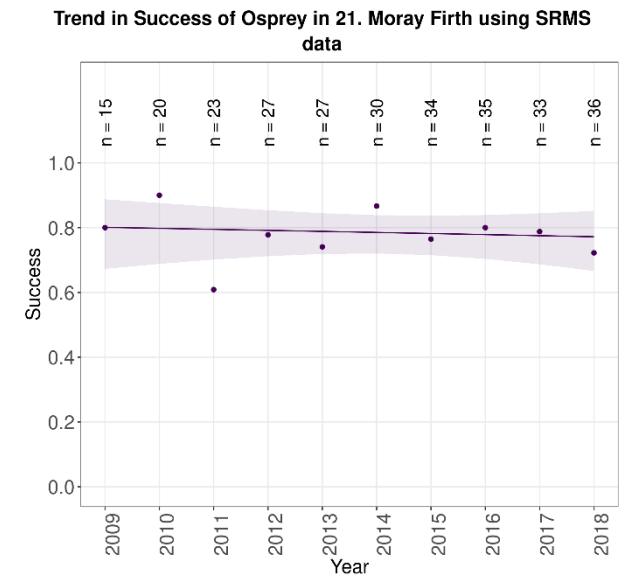
15. Loch Lomond, The Trossachs and Breadalbane trend: Not significant (caveats: Sample sizes small)



16. Eastern Lowlands trend: Not significant



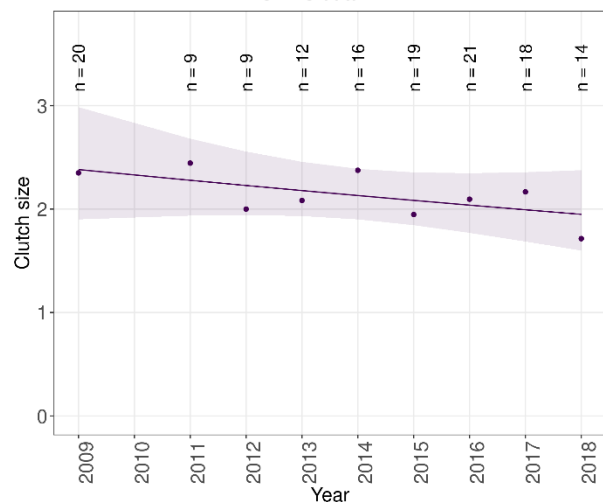
20. Border Hills trend: Not significant (caveats: Sample sizes small)



21. Moray Firth trend: Not significant

Figure 9: Trends in breeding success of Osprey by NHZ region during 2009-2018.

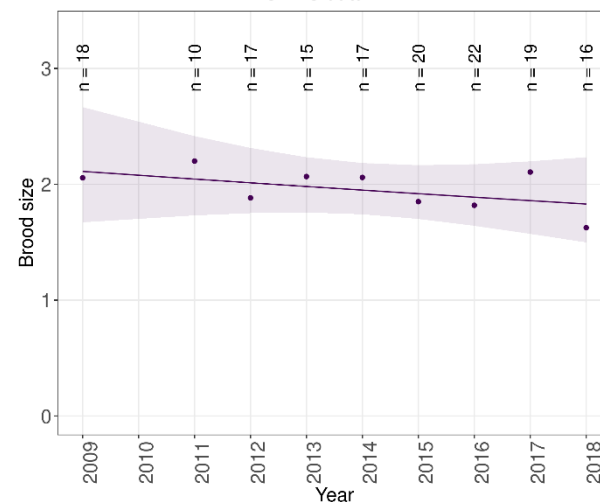
Trend in Clutch size of Osprey in 16. Eastern Lowlands using SRMS data



16. Eastern Lowlands trend: Not significant (caveats: Sample sizes small; No home range random effect)

Figure 10: Trends in clutch size of Osprey by NHZ region during 2009-2018.

Trend in Brood size of Osprey in 16. Eastern Lowlands using SRMS data



16. Eastern Lowlands trend: Not significant (caveats: Sample sizes small; No home range random effect)

Figure 11: Trends in brood size of Osprey by NHZ region during 2009-2018.

Table 4: Details of SRMS Regional trends for Osprey.

Parameter	Region	First year of trend	Last year of trend	Number of years	Mean number of home ranges across years	Mean parameter value (and 95% confidence limits)	Trend during the period	Caveats	Estimated % annual change (and 95% confidence limits)
Pairs	Argyll	2009	2018	10	11.3	7.2 (6.5 to 7.9)	Not significant	Sample sizes small	-3.5 (-11.0 to 4.6)
	Central	2009	2018	10	24.3	17.3 (16.4 to 18.2)	Not significant		1.0 (-4.2 to 6.3)
	Highland	2009	2018	10	35.1	25.8 (22.8 to 28.8)	Increase		4.9 (0.5 to 9.5)
	North East Scotland	2009	2018	10	5.7	4.2 (3.7 to 4.7)	Not significant	Sample sizes small	-3.7 (-13.3 to 7.0)
	Tayside & Fife	2009	2018	9	9.4	5.3 (4.5 to 6.2)	Not significant	Sample sizes small	0.6 (-9.2 to 11.5)
Success	Argyll	2009	2018	10	16.3	0.7 (0.6 to 0.8)	Not significant	Sample sizes small	0.2 (-2.7 to 3.0)
	Central	2009	2018	10	25.2	0.7 (0.6 to 0.7)	Not significant		2.1 (-0.2 to 4.4)
	Highland	2009	2018	10	55.6	0.8 (0.8 to 0.8)	Not significant		-0.5 (-1.7 to 0.6)
	Lothian & Borders	2009	2018	10	10.0	0.7 (0.6 to 0.8)	Decrease	Sample sizes small	-1.7 (-3.3 to -0.4)
	North East Scotland	2009	2018	10	22.8	0.7 (0.6 to 0.7)	Not significant		-0.4 (-2.9 to 1.9)
	Tayside & Fife	2009	2018	9	40.4	0.7 (0.7 to 0.8)	Not significant		1.5 (-0.5 to 3.4)
Clutch size	Scotland	2009	2018	10	43.2	2.4 (2.4 to 2.5)	Not significant		-0.7 (-2.9 to 1.5)
	Tayside & Fife	2009	2018	9	20.8	2.1 (2.0 to 2.2)	Not significant		-0.5 (-4.0 to 3.0)
Brood size	Scotland	2009	2018	10	51.1	2.2 (2.1 to 2.2)	Not significant		-0.2 (-2.5 to 2.0)
	Tayside & Fife	2009	2018	9	22.4	1.9 (1.8 to 2.0)	Not significant		0.3 (-3.2 to 3.9)
Number of fledglings	Scotland	2009	2018	10	124.2	2.0 (2.0 to 2.1)	Not significant		-0.8 (-2.2 to 0.6)
	Argyll	2009	2018	9	11.8	2.2 (2.1 to 2.4)	Not significant		-2.7 (-7.1 to 1.8)
	Central	2009	2018	10	17.2	2.0 (1.9 to 2.1)	Not significant		-1.3 (-4.8 to 2.4)
	Highland	2009	2018	10	43.8	2.1 (2.0 to 2.1)	Not significant		-0.3 (-2.6 to 2.1)
	North East Scotland	2009	2018	8	15.6	2.1 (1.9 to 2.2)	Not significant		-0.5 (-5.1 to 4.3)
	Tayside & Fife	2009	2018	9	28.4	1.9 (1.8 to 2.0)	Not significant		0.7 (-2.5 to 4.1)

Table 5: Details of NHZ Regional trends for Osprey.

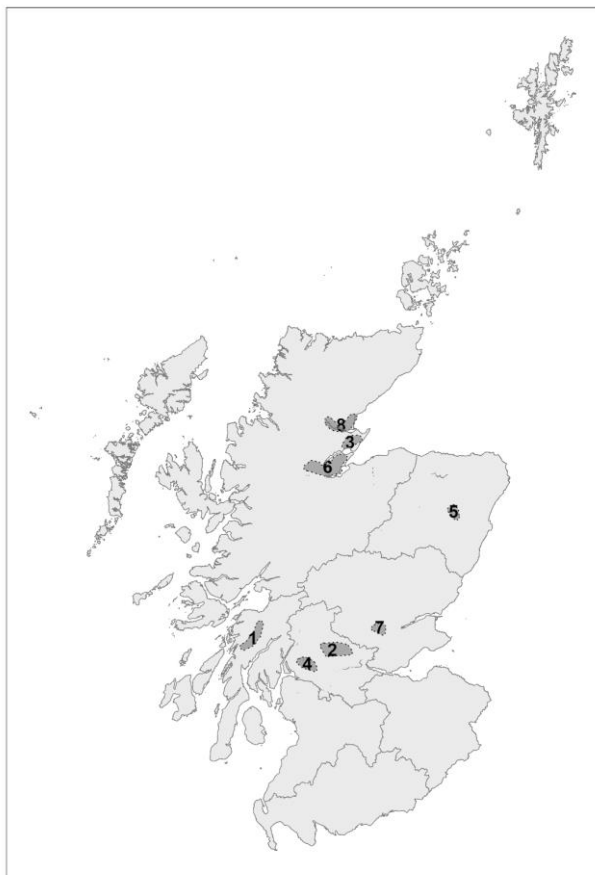
Parameter	Region	First year of trend	Last year of trend	Number of years	Mean number of home ranges across years	Mean parameter value (and 95% confidence limits)	Trend during the period	Caveats	Estimated % annual change (and 95% confidence limits)
Pairs	14. Argyll West and Islands	2009	2018	10	11.3	7.2 (6.5 to 7.9)	Not significant	Sample sizes small	-3.5 (-11.0 to 4.6)
	16. Eastern Lowlands	2009	2018	10	24.2	15.6 (14.1 to 17.1)	Not significant		2.2 (-3.2 to 7.9)
	21. Moray Firth	2009	2018	10	29.8	22.2 (19.5 to 24.9)	Increase		5.1 (0.4 to 10.1)
Success	Scotland	2009	2018	10	176.7	0.7 (0.7 to 0.7)	Non-linear		Non-linear
	12. North East Glens	2009	2018	10	14	0.7 (0.6 to 0.8)	Not significant	Sample sizes small	2.9 (-0.7 to 6.4)
	14. Argyll West and Islands	2009	2018	10	15.3	0.7 (0.6 to 0.8)	Not significant	Sample sizes small	-0.1 (-2.9 to 2.5)
	15. Loch Lomond, The Trossachs and Breadalbane	2009	2018	10	14.3	0.7 (0.6 to 0.7)	Not significant	Sample sizes small	-0.2 (-3.5 to 2.9)
	16. Eastern Lowlands	2009	2018	10	36.7	0.7 (0.7 to 0.8)	Not significant		0.8 (-1.0 to 2.6)
	20. Border Hills	2009	2018	10	10.3	0.7 (0.6 to 0.7)	Not significant	Sample sizes small	-2.5 (-5.4 to 0.1)
	21. Moray Firth	2009	2018	10	28	0.8 (0.7 to 0.8)	Not significant		-0.3 (-2.1 to 1.4)
Clutch size	Scotland	2009	2018	10	43.2	2.4 (2.4 to 2.5)	Not significant		-0.7 (-2.9 to 1.5)
	16. Eastern Lowlands	2009	2018	9	15.33333	2.1 (2.0 to 2.3)	Not significant	Sample sizes small; No home range random effect	-2.2 (-6.0 to 1.7)
Brood size	Scotland	2009	2018	10	51.1	2.2 (2.1 to 2.2)	Not significant		-0.2 (-2.5 to 2.0)
	16. Eastern Lowlands	2009	2018	9	17.11111	1.9 (1.8 to 2.1)	Not significant	Sample sizes small; No home range random effect	-1.6 (-5.5 to 2.5)
Number of fledglings	Scotland	2009	2018	10	124.2	2.0 (2.0 to 2.1)	Not significant		-0.8 (-2.2 to 0.6)

Parameter	Region	First year of trend	Last year of trend	Number of years	Mean number of home ranges across years	Mean parameter value (and 95% confidence limits)	Trend during the period	Caveats	Estimated % annual change (and 95% confidence limits)
Number of fledglings	14. Argyll West and Islands	2009	2018	9	11.44444	2.2 (2.1 to 2.4)	Not significant		-2.5 (-7.0 to 2.1)
	15. Loch Lomond, The Trossachs and Breadalbane	2009	2016	7	10.85714	2.0 (1.8 to 2.2)	Not significant		2.1 (-4.6 to 9.2)
	16. Eastern Lowlands	2009	2018	10	25.9	1.9 (1.8 to 2.0)	Not significant		-1.3 (-4.3 to 1.9)
	21. Moray Firth	2009	2018	10	21.6	2.1 (2.0 to 2.1)	Not significant		-0.4 (-3.7 to 3.1)

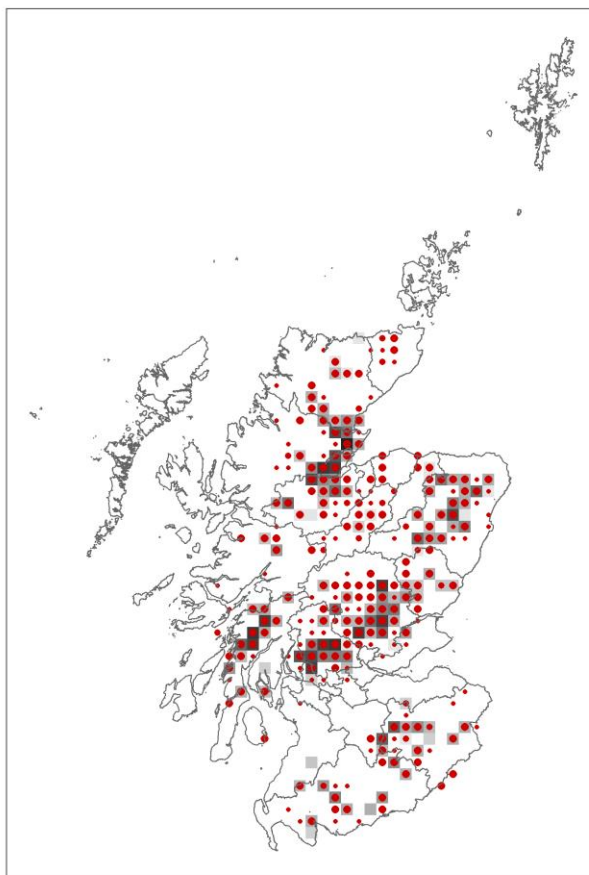
Table 6: Number of Osprey home range checks for occupancy reported to the SRMS during 2009-2018, in each of the 12 SRMS Regions, with approximate proportion of estimated population monitored. At the bottom of the table, row A is the mean number of home range checks over the most recent five years. Row B gives the estimated proportion of the national population in each region, based on Bird Atlas Timed Tetrad Visit (TTV) data. The depth of red shading indicates the relative importance of each region for this species. If survey effort was spread evenly across the whole population, the ratio of A:B would not vary much between regions.

Year	ARGYLL	CENTRAL SCOTLAND	DUMFRIES & GALLOWAY	HIGHLAND	LEWIS & HARRIS	LOTHIAN & BORDERS	NORTH EAST SCOTLAND	ORKNEY	SHETLAND	SOUTH STRATHCLYDE	TAYSIDE & FIFE	UIST	Total
2009	20	28	7	64		10	39			1	55		224
2010	24	29	10	49		12	23			3	1		151
2011	25	33	12	80		11	31			3	65		260
2012	28	35	14	92		14	32			2	67		284
2013	31	38	14	88		14	36			3	65		289
2014	30	41	16	92		15	39			5	69		307
2015	29	43	15	103		15	41			2	74		322
2016	33	48	15	81		15	32			3	83		310
2017	25	45	15	101		15	42			2	81		326
2018	28	43	18	74		15	27			3	62		270
A: Mean home range checks	29.0	44.0	15.8	90.2	Absent	15.0	36.2	Absent	Absent	3.0	73.8	Absent	307.0
B: Proportion of estimated Scottish population	6	9	3	41	0	5	10	0	0	0	25	0	100

a)



b)



c)

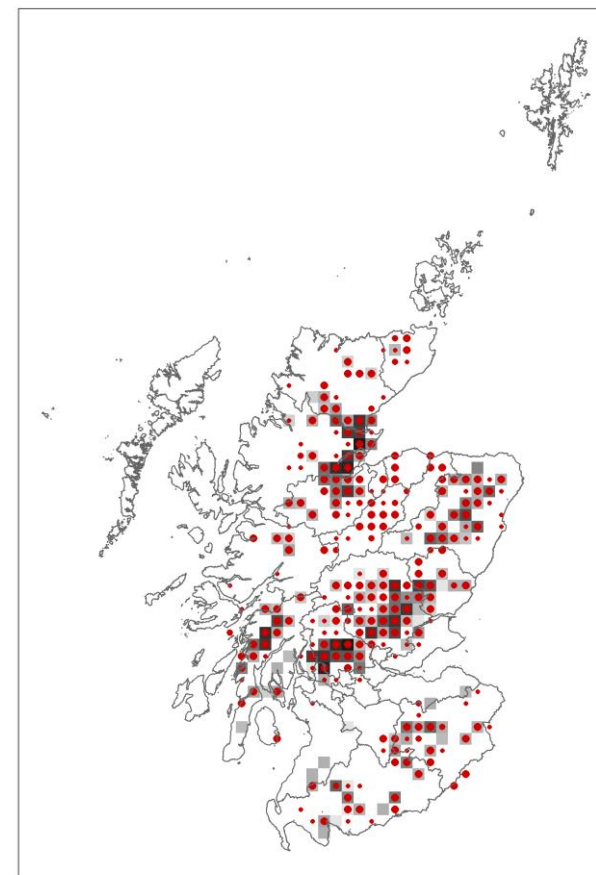


Figure 13: Areas corresponding to the clusters of home ranges from which sufficient data were reported to attempt to derive population trends for Osprey between 2009 and 2018 (a) together with maps showing variation in the number of Osprey records reported to SRMS during 2009-2013 (b) and 2014-2018 (c), in the context of the known Osprey breeding distribution taken from the 2007-2011 Bird Atlas. SRMS data are depicted as grey squares with darker shading indicating more records while Bird Atlas data are depicted as red dots with the size of dot positively related to probability of breeding.